

We Claim

1. Pulverulent active substance formulations comprised of

- 5 - particles of at least one active substance A) which is solid at room
temperature,
- at least one dispersant B),
- a coating material E), and
- optionally additives C),

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wherein the individual active substance particles are in an amorphous state, have an average diameter of not more than 1 µm, and are coated with coating material E.

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2. Active substance formulations according to Claim 1, wherein active substance A) is selected from the group consisting of ibuprofen, clotrimazole, fluconazole, indoxacarb, acetylsalicylic acid and ciprofloxazin.

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3. Active substance formulations according to Claim 1, wherein active substance A) is selected from the group consisting of fungicides, bactericides, insecticides, acaricides, nematicides, molluscicides, herbicides and plant growth regulators.

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4. Active substance formulations according to Claim 1, wherein active substance A) is selected from the group consisting of vitamins, carotenoids and flavors.

5. Active substance formulations according to Claim 1 wherein dispersants B) are selected from the group consisting of nonionogenic, anionic, cationic and zwitterionic substances having surface-active properties.

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6. Active substance formulations according to Claim 1, comprising additives C) wherein additives C) are selected from the group consisting of penetrants, defoamers, low-temperature stabilizers, preservatives, dyes, redispersants, disintegrants, inert fillers and film formers.

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7. Active substance formulations according to Claim 1, wherein coating material E) is selected from the group consisting of polyvinyl alcohol, polyvinyl-pyrrolidone and saccharides.

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8. Active substance formulations according to Claim 7, wherein said coating material E is a saccharide and said saccharide is grape sugar, cane sugar or a polysaccharide.

9. Active substance formulations according to Claim 1, comprising

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- from 10 to 50% by weight active substances A),
- from 5 to 50% by weight dispersant B)
- from 10 to 30% by weight coating material E), and
- from 0 to 50% by weight additives C).

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10. Active substance formulation according to Claim 7 or 9 wherein said coating material E) is polyvinyl alcohol.

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11. Active substance formulation according to Claim 9, wherein said amount of active substance A) is from 15 to 40% by weight, said amount of dispersant B) is from 7.5 to 40% by weight, the amount of said coating material E) is from 15 to 30% by weight and the amount of said additives C) is from 0 to 40% by weight.

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12. Active substance formulations according to Claim 1, wherein said particles have a number average diameter of from 10 to 1,000 nm.

13. Active substance formulations according to Claim 12, wherein said number average diameter is from 40 to 500 nm.
- 5 14. Active substance formulations according to Claim 1, wherein said coating material E) is polyvinyl alcohol, said active substance formulations are in the form of capsules of said polyvinyl alcohol and said capsules have an average capsule diameter of from 50 to 500 µm.
- 10 15. Active substance formulations according to Claim 14, wherein said average capsule diameter is from 10 to 150 µm.
16. Process for producing the pulverulent active substance formulations of Claim 1, which comprises
- 15 a) suspending at least one active substance A) which is solid at room temperature, at least one dispersant B), and optionally additives C) in an aqueous phase,
- 20 b) adding at least one compressible fluid D) in the supercritical state under pressure to the suspension formed in a),
- c) heating the mixture formed in b) until the solid components are liquefied to form a dispersion,
- d) homogenizing the dispersion and then adding an aqueous solution of coating material E), and optionally additives C),
- 25 e) depressurizing the dispersion and subjecting it to drying.
17. Process according to Claim 16, wherein step a) is carried out at a temperature of from 10°C to 30°C.
- 30 18. Process according to Claim 16 or 17, wherein step b) is carried out at a pressure of from 50,000 to 500,000 hPa.

19. Process of Claim 18, wherein said pressure is from 70,000 to 300,000 hPa.
20. Process according to one of Claims 16 or 17, wherein step c) is carried out at
5 a temperature below the melting point (under standard conditions) of the respective active substance or, in the case of active substance mixtures, below the melting point of the solid having the highest melting point.
21. Process according to Claim 20, wherein said respective active substance or
10 said active substance having the highest melting point has a melting point of from 40°C to 220°C.
22. Process according to Claim 21, wherein said melting point is from 50°C to
15 220°C.
23. Process according to Claim 16 or 17, wherein in step d) the emulsion is homogenized using a jet disperser or other high-pressure homogenizer or a homogenizer operating on the rotor/stator principle.
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24. Process according to Claim 23, wherein step d) is conducted with a homogenizer subjecting the dispersion to a pressure difference in the homogenizer at from 40,000 hPa to 1,600,000 hPa.
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25. Process according to Claim 24, wherein said pressure difference is from 50,000 hPa to 1,000,000 hPa.
26. Process for producing the pulverulent active substance formulations of Claim 1, comprising the steps of

- a) suspending at least one active substance A) which is solid at room temperature, at least one dispersant B), and optionally additives C) in an aqueous phase,
 - b) adding at least one compressible fluid D) in the supercritical state under pressure to the suspension formed in a),
 - c) heating the mixture formed in b) until the solid components it comprises are liquefied,
 - d) homogenizing the resultant dispersion,
 - e) mixing the homogenized dispersion with an aqueous solution of coating material E) in a concentration of from 10 to 50% by weight, and optionally with additives C) and then depressurizing the dispersion and subjecting it to drying.
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- 27. Process according to Claim 16, 17 or 26, wherein said drying comprises spray drying or freeze drying.
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 - 28. Process according to Claim 27, wherein said drying is spray drying.
 - 29. Process according to Claim 16, wherein in step e) the dispersion from step d) is depressurized at a rate sufficient to expand the compressible fluid and thereby explode the dispersed solid components, and optionally, at the same time is subjected to spray drying with a dry gas.
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 - 30. The process of Claim 29, wherein said dry gas is dry air, nitrogen or a noble gas.
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 - 31. The process of Claim 30, wherein said dry gas is a noble gas.
 - 32. Process according to Claim 29, wherein said gas is subjected to spray drying in step e), and said spray drying in step e) is carried out at a dry gas entry
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temperature of from 100°C to 200°C, and a dry gas exit temperature of from 50°C to 100°C.

33. Process of Claim 32, wherein said spray drying is carried out at a temperature of from 120°C to 180°C, and said dry gas exit temperature is from 60°C to 90°C.
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34. Process according to Claim 16, wherein in step e) the water present in the homogenized dispersion from step d) is removed by freeze drying.
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35. Process according to Claim 16, wherein said compressible fluid D) is selected from the group consisting of hydrocarbons having 1 to 6 carbon atoms, Freons, nitrogen, noble gases, gaseous oxides, ammonia, alcohols having 1 to 4 carbon atoms, halogenated hydrocarbons, and mixtures thereof.
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36. Process of Claim 35, wherein said compressible fluid D) is selected from the group consisting of methane, ethane, propane, butane, pentane, n-hexane, i-hexane, nitrogen, noble gases, N₂O, CO₂, ammonia, methanol, ethanol, isopropanol, n-propanol, butanol, halogenated hydrocarbons, and mixtures thereof.
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37. Method for applying an active substance to a site, which comprises applying said active substance to said site in the form of a pulverulent active substance formulation of Claim 1.
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38. Method of applying active substances to a targeted organism and/or its habitat, which comprises delivering said active substances to said organism or habitat in the form of the pulverulent active substance formulation of Claim 1, optionally after dilution with extenders and/or surface-active substances.
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39. Apparatus for carrying out the process according to Claim16, comprising at least a device for metering a compressible fluid D) under pressure into a pressure-resistant vessel (2) which is provided with a stirrer and is connected via a pump (3) suitable for generating pressure to a heat exchanger (4), to which a homogenizing jet disperser (5), is connected, from which a pipeline closable with a valve leads back into the vessel (2) and from which, optionally, a pipeline leads to a cooling circuit which is provided with a pump and whose outlet line is connected to a metering pump (9) and also, optionally, to a mixing vessel, the pipeline leading on from the latter being connected to a spray dryer (10).
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40. Process for producing the pulverulent active substance formulations of Claim 1, comprising the steps of
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- a) suspending at least one active substance A) which is solid at room temperature, at least one dispersant B), at least one coating material E), and optionally additives C) in an aqueous phase,
 - b) adding at least one compressible fluid D) in the supercritical state under pressure to the suspension formed in a),
 - c) heating the mixture formed in b) until the solid components it comprises are liquefied,
 - d) homogenizing the resultant dispersion, and then
 - e) depressurizing the dispersion and subjecting it to drying.
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